

Date: Tuesday, 23/09/2008 3:22:21 PM
 User: Julie Lecocq

Process Sheet

Customer :	CU-DAR001 Dart Helicopters Services	Drawing Name :	BO 105 SKIDTUBE ASSEMBLY
Job Number :	42260		
Estimate Number :	10112		
P.O. Number :		Part Number :	D105674011G
This Issue :	23/09/2008	S.O. No. :	
Prsht Rev. :	NC	Drawing Number :	D2966 REV A2
First Issue :	//	Project Number :	N/A
Previous Run :	41641	Drawing Revision :	A2
Written By :		Material :	
Checked & Approved By :	<u>JD 08.9.23</u>	Due Date :	05/10/2008
Comment :	Est Rev:A 04.07.07 New Issue KJ/JLM		

Qty: 1 Um: Each

Additional Product

Job Number:



Scrap

Seq. #:	Machine Or Operation:	Description :
1.0	DC	DOCUMENT CONTROL
Comment: DOCUMENT CONTROL Photocopy bluefile & type labels per PPP D105-674-011G CHG002		
2.0	D2962125	Outer Tube Extrusion
Comment: Qty.: 1.0000 Each(s)/Unit Total : 1.0000 Each(s) Pick: Qty Part Number Description Batch 1 D2962-125 Extrusion <u>B17532</u>		
		<u>RT 08-09-24</u>
3.0	SKIDTUBES 1	SKIDTUBESS RESOURCE 1
Comment: LANDING GEAR RESOURCE 1 1-Determine square end of tube and deburr 2-Drill #30 pilot holes using DT8678. Open holes to Ø5/16" (0.313"). Deburr holes.		
		<u>RT 08-09-24</u>
4.0	BENDING	BENDING MACHINE - SKIDTUBES
Comment: BENDING MACHINE Bend tube as per program BO105 on CNC Bender and Dwg D2966. Use 5/16" locator pin on buggy "A".		
		<u>RT 08-09-24</u>
5.0	SKIDTUBES 1	SKIDTUBESS RESOURCE 1
Comment: LANDING GEAR RESOURCE 1 1-Cut Fwd end of the tube using DT8185-1G		
		<u>RT 08-09-24</u>

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

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Drawing Name: BO 105 SKIDTUBE ASSEMBLY

Job Number: 42260

Part Number: D105674011G

Job Number:



Seq. #:

Machine Or Operation:

Description :

~~2~~-Cut Aft end at 107.06" using DT8185D

~~3~~-Deburr ends

~~4~~-Drill Aft Cap holes using DT8678

~~5~~-Locate DT8679 with 1/8 clecos in Aft Cap holes. Ensure DT8679 is centered on Fwd end of tube and drill #40 Fwd bushing.

~~6~~-Clamp DT8679 to the tube. Drill all #30 wearplate and crossbolt holes.

7-Open Aft Cap holes using #6 drill

8-Open wearplate holes and two side holes to Ø19/64" (0.297") as per Dwg

D2966-1.

9-Deburr holes.

10-Open remaining (16) crossbolt holes to Ø0.500

RT
06-09
24

6.0

D2964

Cap



Comment: Qty.: 1.0000 Each(s)/Unit Total: 1.0000 Each(s)

Pick:

Qty Part Number

Description Batch

1 D2964

Cap

14101

RT 06-09-24

A/R

Aluminum Rod

M108708/M107877

BE 08/09/25

7.0

SKIDTUBES 1

SKIDTUBESS RESOURCE 1



Comment: LANDING GEAR RESOURCE 1

1-Weld Fwd Cap as per Dwg D2966 and QSI 004. Fill #40 Fwd cleco hole.

BE 08/09/25

2-Grind Fwd Cap welds flush

RT 06-09-24

8.0

QC10

VISUAL INSPECTION OF GROUND WELDS



Comment: VISUAL INSPECTION OF GROUND WELDS

BE 08/09/25

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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Part Number: D105674011G

Job Number:



Seq. #:	Machine Or Operation:	Description :
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9.0

QC5

INSPECT WORK TO CURRENT STEP



Comment: INSPECT WORK TO CURRENT STEP

8 08/09/05 (40)

10.0

HAND FINISHING1

HAND FINISHING RESOURCE #1



Comment: HAND FINISHING RESOURCE #1

Chemical Conversion Coat as per QSI 005 4.1

RT 08-09-25

11.0

QC3

INSPECT POWDER COAT/CHEMICAL CONVERSION



Comment: INSPECT POWDER COAT/CHEMICAL CONVERSION

Q.m 08-09-25

12.0

SKIDTUBES 1

SKIDTUBESS RESOURCE 1



Comment: LANDING GEAR RESOURCE 1

1-Open crossbolt holes to finish size as per Dwg D2966

2-Open 14 holes to Ø0.750" & 2 holes to Ø0.875", countersink crossbolt holes & remove alodine to prepare for welding as per Dwg D2966

3-Deburr holes inside & outside, blow out chips

RT 08-09-25

13.0

D2976

BO 105 Skidtube I Beam



Comment: Qty.: 1.0000 Each(s)/Unit Total.: 1.0000 Each(s)

Pick:

Qty Part Numbe

Description Batch

1 D2976 Web

42269

SCRAP

PTU

RT 08-09-25

14.0

D2971

Cross Bolt Spacer



Comment: Qty.: 1.0000 Each(s)/Unit Total: 1.0000 Each(s)

Pick:

Qty Part Number

Description Batch

1 D2971 Crossbolt Spacer

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: D105-674-011G PAR #: 137 Fault Category: Prod/Skid/bse NCR: Yes No DQA: A Date: 08/10/21
 Resolution: _____ Disposition: _____ QA: N/C Closed: A Date: 08/10/21

NCR: 42260		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			
08.10.15	13	DISCOVERED THAT WED D2976 WEB HOLES ARE MISALIGNED CAUSING AND D2973 SPACERS CAN'T FIT IN	PA 08.10.15 QSI 042	Scrap and destroy. → <u>88 TO 15</u> possible stress risers. See attached	PI 08.10.15 QSI 043	<u>08/10/15</u>	PA 08.10.15 QSI 042	<u>08/10/15</u>
				See PAR 08-037				

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Drawing Name: BO 105 SKIDTUBE ASSEMBLY

Job Number: 42260

Part Number: D105674011G

Job Number:



Seq. #:

Machine Or Operation:

Description :

15.0

D2973

Cross Bolt Spacer



Comment: Qty.: 7.0000 Each(s)/Unit Total: 7.0000 Each(s)

Pick:

Qty Part Number Description Batch

7 D2973 Crossbolt Spacer

16.0

SKIDTUBES 1

SKIDTUBESS RESOURCE 1



Comment: LANDING GEAR RESOURCE 1

1-Bond Web in place per QSI 015. (Ensure holes line up)

Pick:

Qty Part Number Description Batch

A/R Sikaflex-291 M109338

Sikaflex expiry date: 08-11-01

RT 08-09-25

2-Weld Crossbolt Spacers as per Dwg D2966 and QSI 004. For crossbolt spacer, weld one side, pass 5/8" drill; weld other side, pass 5/8" drill.

Pick:

Qty Part Number Description Batch

A/R Aluminum Rod

3-Pass Ø0.630" drill to remove spillover for D2973 crossbolt. Pass Ø0.750" drill to remove spillover for D2971 crossbolt.

4-Grind welds flush as per Dwg D2966

17.0

QC10

VISUAL INSPECTION OF GROUND WELDS



Comment: VISUAL INSPECTION OF GROUND WELDS

18.0

QC5

INSPECT WORK TO CURRENT STEP



Comment: INSPECT WORK TO CURRENT STEP

19.0

HAND FINISHING1

HAND FINISHING RESOURCE #1



Comment: HAND FINISHING RESOURCE #1

Powder Coat Grey Sandtex (Ref: 4.3.5.6) as per QSI 005 4.3

W/O:		WORK ORDER CHANGES					
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Job Number: 42260

Part Number: D105674011G

Job Number:



Seq. #:

Machine Or Operation:

Description :

20.0

QC3

INSPECT POWDER COAT/CHEMICAL CONVERSION



Comment: INSPECT POWDER COAT/CHEMICAL CONVERSION

21.0

D2965

Cap, 105 Skidtube



Comment: Qty.: 1.0000 Each(s)/Unit Total : 1.0000 Each(s)

Pick:

Qty Part Number Description Batch

1 D2965 Cap

22.0

D29701

Wearplate



Comment: Qty.: 1.0000 Each(s)/Unit Total : 1.0000 Each(s)

Pick:

Qty Part Number Description Batch

1 D2970-1 Wearplate

23.0

D29703

Wearplate



Comment: Qty.: 1.0000 Each(s)/Unit Total : 1.0000 Each(s)

Pick:

Qty Part Number Description Batch

1 D2970-3 Wearplate

24.0

D31761

Bushing



Comment: Qty.: 1.0000 Each(s)/Unit Total : 1.0000 Each(s)

Pick:

Qty Part Number Description Batch

1 D3176-1 Bushing

25.0

D31763

Nut



Comment: Qty.: 1.0000 Each(s)/Unit Total : 1.0000 Each(s)

Pick:

Qty Part Number Description Batch

1 D3176-3 Nut

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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Job Number: 42260

Part Number: D105674011G

Job Number:



Seq. #:

Machine Or Operation:

Description :

26.0

ALS71032130

Insert



Comment: Qty.: 36.0000 Each(s)/Unit Total : 36.0000 Each(s)

Pick:

Qty Part Number Description Batch

36 ALS7-1032-130 Insert _____

or ALS4-1032-130

or AKS7-1032-130

or AKS4-1032-130

27.0

AN960JD10L

Washer



Comment: Qty.: 28.0000 Each(s)/Unit Total : 28.0000 Each(s)

Pick:

Qty Part Number Description Batch

28 AN960JD10L Washer _____

28.0

MS27039108

Screw



Comment: Qty.: 26.0000 Each(s)/Unit Total : 26.0000 Each(s)

Pick:

Qty Part Number Description Batch

26 MS27039-1-08 Screw _____

29.0

MS27039109

Screw



Comment: Qty.: 2.0000 Each(s)/Unit Total : 2.0000 Each(s)

Pick:

Qty Part Number Description Batch

2 MS27039-1-09 Screw _____

30.0

HAND FINISHING1

HAND FINISHING RESOURCE #1



Comment: HAND FINISHING RESOURCE #1

1-Inspect for foreign objects as per QSI 024

2-Install Inserts, Wearplate and Cap per Dwg D2966. Insert a drop of sikaflex at insert holes before installing wearplates. Seal Aft Cap using Sikaflex. Install bushing and nut. By looking Fwd, install nut to right hand side.

Pick:

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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Job Number: 42260

Part Number: D105674011G

Job Number:



Seq. #:

Machine Or Operation:

Description :

Qty Part Number Description Batch

A/R Sikaflex-291

Sikaflex expiry date:

3-Wing Walk as per Dwg D2966 and QSI 005 4.4

Batch:

31.0

QC3

INSPECT POWDER COAT/CHEMICAL CONVERSION



Comment: INSPECT POWDER COAT/CHEMICAL CONVERSION

32.0

QC5

INSPECT WORK TO CURRENT STEP



Comment: INSPECT WORK TO CURRENT STEP

*****ENSURE INSERT ARE AT LOCATION (6) AS PER DWG D2966*****

33.0

PACKAGING 1

PACKAGING RESOURCE #1



Comment: PACKAGING RESOURCE #1

Pick: Packing Kit

34.0

D2972

Bushing



Comment: Qty.: 6.0000 Each(s)/Unit Total: 6.0000 Each(s)

Pick: Packing Kit

Qty Part Number

Description

Batch

6 D2972

Bushing

35.0

D2974

Packer



Comment: Qty.: 1.0000 Each(s)/Unit Total: 1.0000 Each(s)

Pick: Packing Kit

Qty Part Number

Description

Batch

1 D2974

Packer

36.0

D2975

Wearshoe



Comment: Qty.: 2.0000 Each(s)/Unit Total: 2.0000 Each(s)

Pick: Packing Kit

Qty Part Number

Description

Batch

2 D2975

Wearplate

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
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Job Number: 42260

Part Number: D105674011G

Job Number:



Seq. #:

Machine Or Operation:

Description :

37.0

AN451A

Bolt



Comment: Qty.: 3.0000 Each(s)/Unit Total : 3.0000 Each(s)

Pick: Packing Kit

Qty Part Number Description Batch

3 AN4-51A Bolt

38.0

AN960JD10L

Washer



Comment: Qty.: 8.0000 Each(s)/Unit Total : 8.0000 Each(s)

Pick: Packing Kit

Qty Part Number Description Batch

8 AN960JD10L Washer

39.0

MS21042L4

Nut



Comment: Qty.: 3.0000 Each(s)/Unit Total : 3.0000 Each(s)

Pick: Packing Kit

Qty Part Number Description Batch

3 MS21042L4 Nut

40.0

MS27039108

Screw



Comment: Qty.: 8.0000 Each(s)/Unit Total : 8.0000 Each(s)

Pick: Packing Kit

Qty Part Number Description Batch

8 MS27039-1-08 Screw

41.0

QC4

INSPECT 100% KITS FOR COMPLETENESS



Comment: INSPECT 100% KITS FOR COMPLETENESS

42.0

PACKAGING 1

PACKAGING RESOURCE #1



Comment: PACKAGING RESOURCE #1

Identify and pack for shipping as per PPP D105-674-011G

Location: _____

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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Job Number: 42260

Part Number: D105674011G

Job Number:



Seq. #:

Machine Or Operation:

Description :

43.0

QC21

FINAL INSPECTION/W/O RELEASE



Comment: FINAL INSPECTION/W/O RELEASE

Job Completion



MF 08-10-20

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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NOTE: Date & initial all entries



DESIGN RF	DRAWN BY RF	DART AEROSPACE USA, INC. BELLEVUE, WA	
CHECKED [Signature]	APPROVED [Signature]	DRAWING NO. D2966	REV. A SHEET 1 OF 2
DATE 00.03.08		TITLE BO 105 SKIDTUBE ASSEMBLY	SCALE NTS
A	00.03.08	NEW ISSUE	

RELEASED
00.05.11 [Signature]

Qty	Part Number	Description
X	D2966-041	SKIDTUBE ASSEMBLY
1	D2962-125	EXTRUSION
1	D2964	CAP
1	D2965	CAP
1	D2970-1	WEARPLATE
1	D2970-3	WEARPLATE
1	D2971	CROSS BOLT SPACER
7	D2973	CROSS BOLT SPACER
1	D2976	WEB
36	ALS7-1032-130 or ALS4-1032-130 or AKS7-1032-130 or AKS4-1032-130	INSERT
28	AN960JD10L	WASHER
26	MS27039-1-08	SCREW
2	MS27039-1-09	SCREW
1	D3176-1	BUSHING
1	D3176-3	NUT



GENERAL NOTES:

- 1) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED
- 2) WELDING TO BE DONE PER DART QSI 004.
- 3) INSERT D2976 WEB TO LOCATION SHOWN OFF AFT END OF SKIDTUBE AND BOND WEB INTO OUTER TUBE WITH NON-STRUCTURAL SIKAFLEX-241/-291 ADHESIVE PER DART QSI 015 AFTER BENDING.
- 4) USE DART DRILL TEMPLATE DT8451 TO LOCATE AND DRILL Ø0.297 HOLES FOR WEARSHOE INSERTS. INSTALL ALS7-1032-130 PER SECTION B-B (34 PLACES) AFTER FINISH. SEAL WEARPLATE SCREWS WITH SIKAFLEX-241/-291.
- 5) DO NOT INSTALL MS27039-1-08 SCREWS AND AN960JD10L WASHERS IN THESE LOCATIONS.
- 6) INSTALL ALS7-1032-130 INSERT, MS27039-1-08 SCREW, AND AN960JD10L WASHER IN 2 PLACES THIS LOCATION BEFORE POWDER COATING.
- 7) FINISH:
ACID ETCH, ALODINE PER DART QSI 005 4.1 PRIOR TO INSERTING D2976 WEB
POWDER COAT ASSEMBLY ~~GLOSS WHITE (REF 4.3.6.1)~~ PER DART QSI 005 4.3
BLACK ANTI-SKID PAINT AS INDICATED TO 1.00 ABOVE CENTER LINE PER DART QSI 005 4.4 (OPTIONAL) BLACK SANDTEX (REF 4.3.5.7)



01.01.29
[Signature]
01.01.30

A2	02.10.30	ADD D3176-1/-3	[Signature]
A1	01.01.29	CHANGE COLOR TO BLACK SANDTEX	[Signature]

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RETURN TO
ENGINEERING
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SUBJECT TO AMENDMENT
WITHOUT NOTICE
WORK ORDER
422100

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
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NOTE: Date & initial all entries

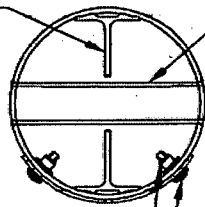
BLACK ANTI-SKID

DETAIL

USE D2962-125 EXTRUSION

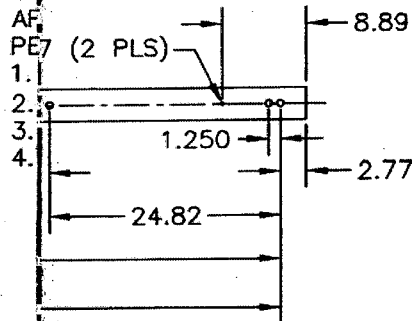
SECTION B-B
SCALE 1:6

D2976 WEB (REF)



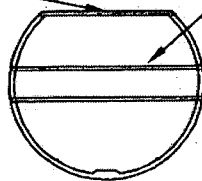
ALS7-1032-130 INSERT (34 PLACES)

MS27039-1-08 SCREW (1)
AN960JD10L WASHER (1)
(26 PLACES)



SECTION C-C
SCALE 1:6

D2964 CAP (REF)



BLACK ANTI-SKID

D2976 WEB

REFER TO DETAIL D

DETAIL D
SCALE 1:6

0.40

D2976 WEB (REF)

1.50

DRAWN BY
RF

APPROVED
RF

DART

DART AEROSPACE USA, INC.
BELLEVUE, WA

DRAWING NO.
D2966

TITLE

BO 105 SKIDTUBE ASSEMBLY

REV. A
SHEET 2 OF 2

SCALE

1:20

RELEASED
00-05-11

SHOP COPY
RETURN TO
ENGINEERING
UNCONTROLLED COPY
SUBJECT TO AMENDMENT
WITHOUT NOTICE
WORK ORDER
NO. 42260

Peter Hum

From: David Shepherd [dshepherd@dartaero.com]
Sent: Wednesday, October 15, 2008 1:33 AM
To: 'Peter Hum'
Cc: 'Mike Petsche'
Subject: RE: D105-674 web deviation

Peter,

If it were one location, I'd be OK with it. But you say its a few locations.
The grinding will create stress risers ... therefore we will have several stress risers.
Sounds like a dog's breakfast to me. My inclination would be to scrap the tube rather than take a risk.

David

From: Peter Hum [mailto:phum@dartaero.com]
Sent: Tuesday, October 14, 2008 12:42 PM
To: 'David Shepherd'
Cc: 'Mike Petsche'
Subject: D105-674 web deviation

David,

Production is making a set of D105-674-011 skidtubes. The web was bonded into the skidtube.

At a few locations where spacers are welded into the skidtube, the web is interfering with the installation of the spacer.
See the attached sketch.

It was discovered that the holes on the web jig are NOT centered on the centerline of the web – jig will be replaced. This won't be a reoccurring problem.

Is it acceptable to grind the web holes that interfere with the spacers at the required locations?.....The outer skidtube will not be touched.

Peter

P.S. I think this is OK, but I am not 100% sure.

~~No virus found in this outgoing message.~~

Checked by AVG.

Version: 7.5.524 / Virus Database: 270.8.0/1724 - Release Date: 10/14/2008 2:02 AM

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Checked by AVG.

Version: 7.5.524 / Virus Database: 270.8.0/1724 - Release Date: 10/14/2008 2:02 AM

Peter Hum

From: David Shepherd [dshepherd@dartaero.com]
Sent: Wednesday, October 15, 2008 1:33 AM
To: 'Peter Hum'
Cc: 'Mike Petsche'
Subject: RE: D105-674 web deviation

Peter,

If it were one location, I'd be OK with it. But you say its a few locations.
The grinding will create stress risers ... therefore we will have several stress risers.
Sounds like a dog's breakfast to me. My inclination would be to scrap the tube rather than take a risk.

David

From: Peter Hum [mailto:phum@dartaero.com]
Sent: Tuesday, October 14, 2008 12:42 PM
To: 'David Shepherd'
Cc: 'Mike Petsche'
Subject: D105-674 web deviation

David,

Production is making a set of D105-674-011 skidtubes. The web was bonded into the skidtube.

At a few locations where spacers are welded into the skidtube, the web is interfering with the installation of the spacer.
See the attached sketch.

It was discovered that the holes on the web jig are NOT centered on the centerline of the web – jig will be replaced. This won't be a reoccurring problem.

Is it acceptable to grind the web holes that interfere with the spacers at the required locations?.....The outer skidtube will not be touched.

Peter

P.S. I think this is OK, but I am not 100% sure.

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